

PISCES.

The receding tide left numerous small pools among the rocks: these contained many small fish, among which the following were identified.

Mugil coeruleo-maculatus, Lacépède.

Mugil jerdoni, Day.

Mugil waigiensis, Quoy and Gaim.

Muraena meleagris, Shaw.

Periophthalmus koelreuteri (Pall).

Salarias dussumieri, Cuv. and Val.

Salarias lineatus Cuv. and Val.

Sciæna miles, Cuv. and Val.

Tetraodon fluviatilis, Ham. Buch.

Therapon jerbua (Forsk.).

With the exception of the two species of *Salarias*, all were quite young immature specimens.

All the freshwater streams flowing into the Basin were swarming with examples of *Haplochilus panchax* (Ham. Buch.), and a few examples of *Haplochilus melastigma* (McClell.) were also obtained from the same sources. To one of the larger specimens of the former a parasitic Copepod, belonging to the Lernaeopodidae, was attached just beneath the left ventral fin.

INSECTA.

Several small pools of water in holes in the rocks above high-water mark were found to be swarming with mosquito larvae and nymphæ; these, when hatched out, proved to be a species of *Culex*. The water, which was salt, had owing to evaporation become exceedingly concentrated, and an analysis of a sample by the Chemical Examiner, Rangoon, gave the following results:—

Total solids = 6035·12 grains per gallon.

Chlorides = 3024·00 " " "

The water was thus nearly three times as concentrated as ordinary sea-water and yet these animals were able to live and breed in it freely.

CRUSTACEA.—The following species are all fairly common on the beach or in the adjacent Mangrove swamps.

Grapsus strigosus, Herbst.

Ocypoda ceratophthalma (Pallas), Ortm.

Ocypoda cordimana, Desm.

Sesarma quadratum, Fabr.

Sesarma taeniolum, White.

The *Ocypoda ceratophthalma* were exceedingly common; as is well known these crabs burrow in the sand and make holes for themselves, in which they live. The larger specimens

merely dig out the sand and leave it lying in a small mound around the entrance to their burrow, but the smaller examples adorn the entrance and the part of the sand around with a "pattern" composed of numerous little sand balls.

Ordinarily the "pattern" is very simple, the sand balls being irregularly arranged round the entrance with two or three well marked paths running radially outwards (Fig. 1), but in certain other cases, and frequently in some particular portion

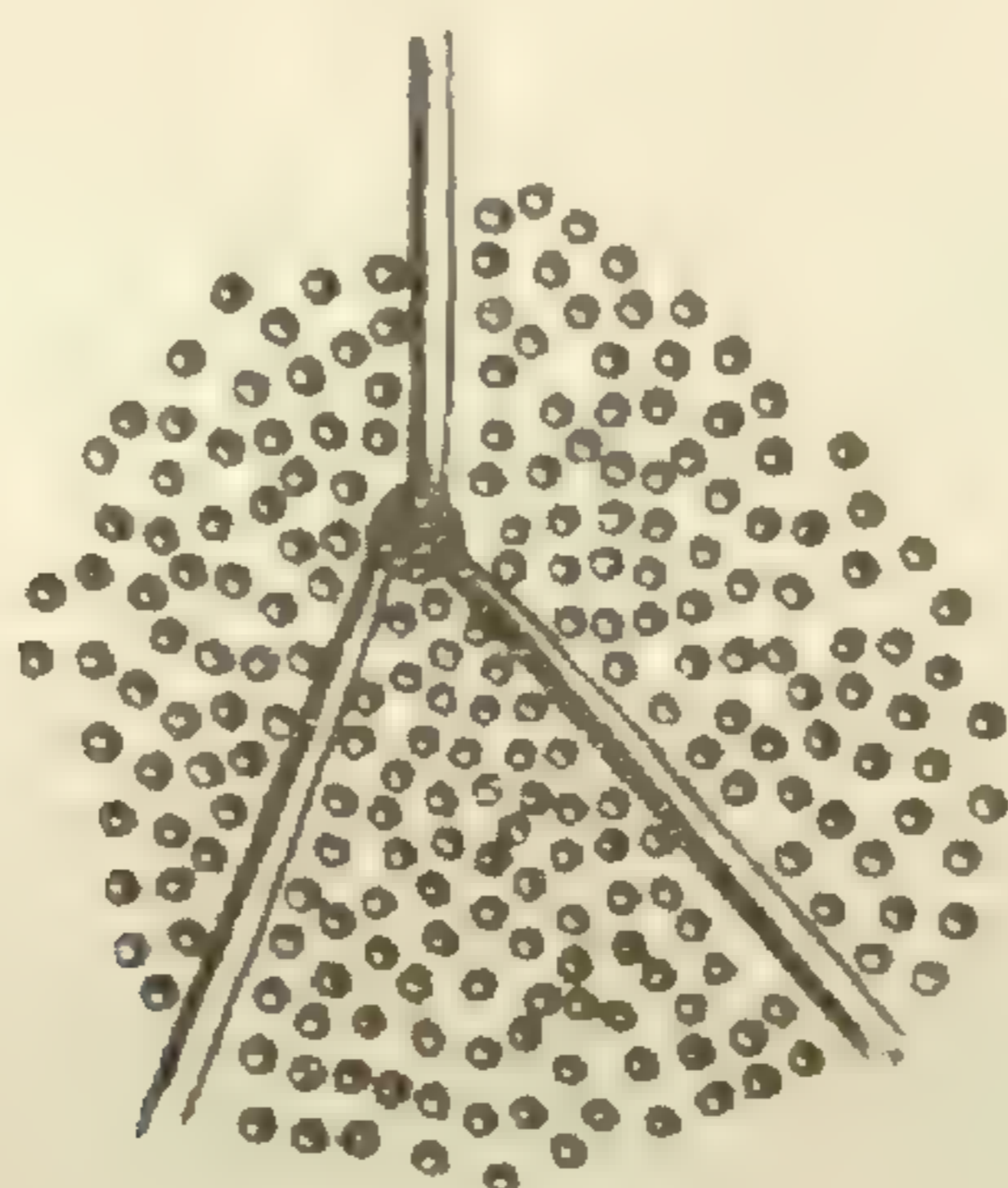


FIG. 1.

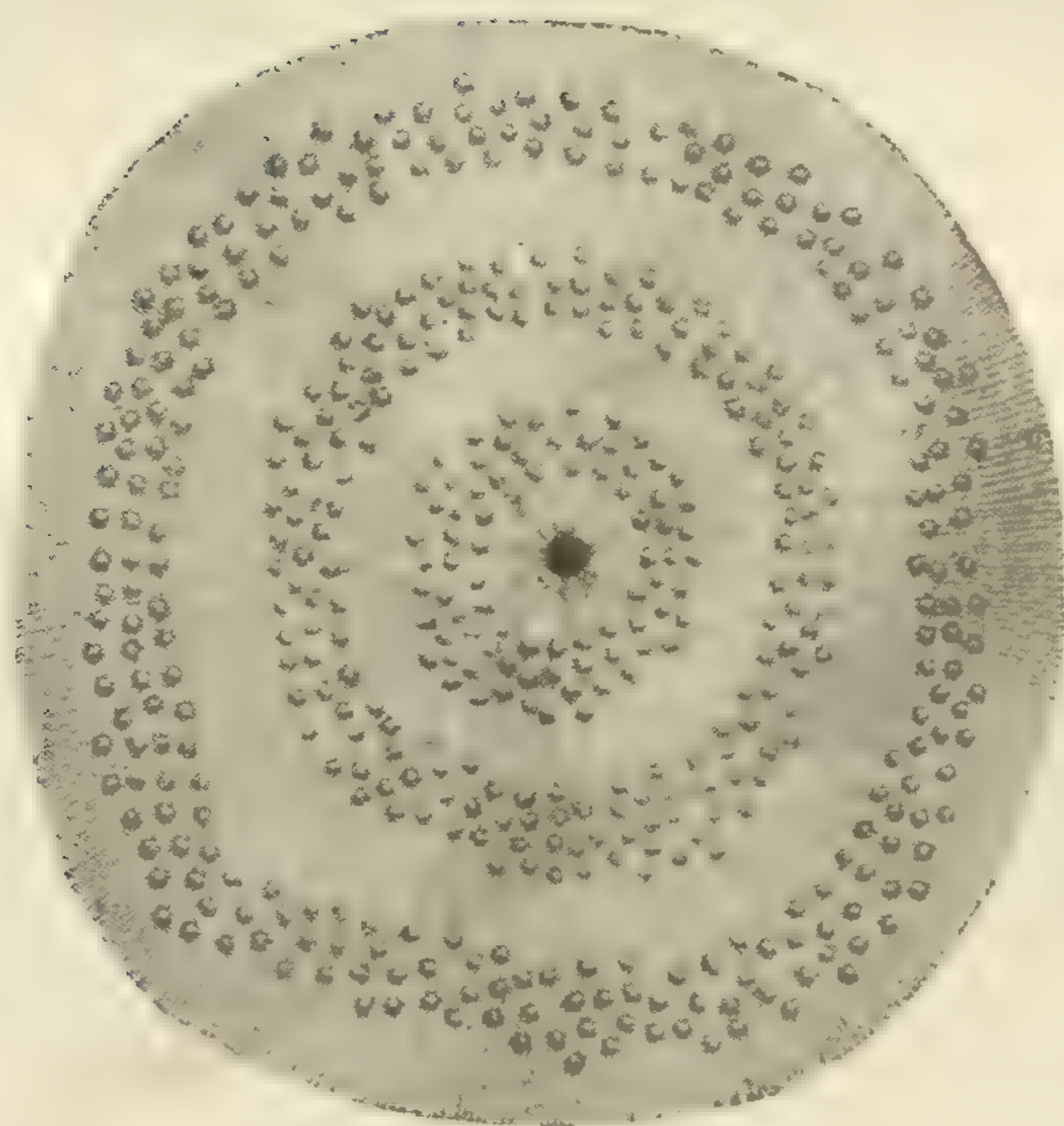


FIG. 2.

of the sandy beach, these crabs arrange the sand-pellets in a circular pattern, sometimes forming as many as six concentric circles (Fig. 2). These circles are not made one after the other, a second being commenced when the first had been completed, but all six would be commenced simultaneously and gradually continued round the hole until the pattern was complete.

For a long time I was unable to ascertain how the crab manufactures these little pellets of sand. That they were not

faecal in origin was shown by the fact that they were far too large, in many cases being almost half the size of the crab itself, and further, the intestinal contents are, on examination found to be quite soft and free from gritty matter. Apparently what happens is this; the crab with its chelae shovels sand into its mouth and here a sorting process is carried out, anything edible being passed on into the stomach while the insoluble sand is rejected and appears as a small shining globule just in front of the centre of the frontal border of the carapace: when this globule has reached the correct size it is knocked off by a sharp movement of one, usually the right, chela.

The examples of *Ocypoda* and *Sesarma* crabs also exhibit a very interesting gradation in their colouring which appears to be an adaptation to the surroundings in which they live. The *Ocypoda ceratophthalma* living on the sandy beach were of a light colour with grey and brown spots and fine mottlings on the carapace and legs, and it was distinctly noticeable that those specimens, whose burrows were situated in the damp sand between high and low tide marks, were darker in appearance than those who inhabit the dry sand in the upper part of the beach.

Along the edge of the scrub at the upper part of the beach the ground was covered with a coarse grass; here the *Ocypoda cordimana* were found living, and in this species the large chelae and the anterior part of the carapace is tinged with a yellow-green colour while the rest of the carapace and legs were marked with a finely-granular greyish-brown colour, a type of colouring that harmonized exceedingly well with their surroundings. The two species of *Sesarma* were both of a dark colour, but still showed a distinctly "protective" colouration. The examples of *S. quadratum* which were found frequenting crevices in the rocks and stones, were of a dark-brown colour dotted over with grey and yellow mottlings on the carapace, and the legs were of a light brown colour with purple-brown mottlings. The *S. taeniolum*, however, inhabited the Mangrove swamps, and they showed an almost uniform purple-brown colouration of the carapace and legs while the great chelae were of a bright red colour.

In addition to the above, examples of—

Charybdis (Goniosoma) affinis, Dana.

Charybdis (Goniosoma) crucifera (Fabr.), A. M. Edw.

Charybdis (Goniosoma) rostrata, A. M. Edw.

Dorripe astuta, Fabr.

Matuta victor, Fabr., Hilgendorf.

Varuna litterata (Fabr.), A. M. Edw.

were obtained from the waters at the entrance, and the rock-pools were found to be swarming with examples of a species of *Leander*, many of which were ovigerous females.

Several examples of *Palaemon* sp. were obtained from the small freshwater stream, that flowed into the sea near the entrance (*vide supra*, p. 333).

XIPHOSURA.—Although no specimens of *Limulus* were obtained, their cast shells were exceedingly common on the long stretch of sand, that lies to the south of the entrance (also *vide Rec. Ind. Mus.*, Vol. VII, p. 87, Calcutta 1912).

MOLLUSCA.—A large collection of shells was made in this locality, as in others visited later: unfortunately in the present condition of the collection in the Indian Museum, it is impossible to work them out fully and consequently no detailed reference to this group will be made in this report. A list of the species, which have been provisionally identified by comparison with named specimens in the Museum collection, and their distribution, is given below (Table 1). In all cases the same nomenclature as that in use in the Indian Museum has been retained.

HIRUDINEA.—Several examples of a leech, probably *Limnatis granulosa* (Sav.), were obtained from the same stream mentioned above. These, along with the rest of the collection in the Indian Museum, have been referred to Mr. W. A. Harding of Cambridge, England.

COELENTERATA.—Small dark-red sea anemonies were fairly common on the rocks to the south of the entrance (Kantaung Promontory), and several examples of a stalked species were obtained from a small patch of sandy mud at the mouth of the entrance: these latter were shaped exactly like a wine-glass, having a narrow stalk that suddenly widened out below into a broad flat plate, that served to fix the animal in the mud.

Byikhwaw Bay.—This bay is situated at the extreme end of the long promontory that runs nearly due south between Tavoy River and the sea; it is large, with a shelving sandy beach, and at both extremities are rocky reefs, the rocks being encrusted with large barnacles and masses of rock-oysters. Between the bay and Tavoy River there is a patch of low-lying country, partly cultivated, but for the most part occupied by a large mangrove-swamp traversed by a creek that flows into the river.

On two occasions I was able to spend a week on shore here, the first was from January 9th to 14th, and the last from March 6th to 11th, 1911. At low tide numerous rock pools were left in the reef to the west of the bay, and these were swarming with animal life, among the most conspicuous objects being groups of Serpulid worms and brilliantly coloured sea-anemonies.

PISCES.—Numerous species of fish were obtained from the rock pools and from the waters of the bay, and among them the following were identified:—

Atherina pinguis, Lacépede.

Apogon fasciatus (White).* (= *A. novemfasciatus*, Cuv. and Val.)

Caranx affinis, Rüpp.

Caranx hippos (Linn.).

Chilodipterus lineatus (Forsk.).

Clupea longiceps (Cuv. and Val.).

Eleotris muralis (Quoy and Gaim) Cuv. and Val.

Equula fasciata, Lacépede.

Gobius ornatus, Rüpp.

Glyphidodon notatus, Day.

Glyphidodon septemfasciatus, Cuv. and Val. [= *Abudefduf septemfasciatus* (C. V.)]

Mugil waigiensis, Quoy and Gaim.

Muraena nebulosa, Ahl. [= *Echidna nebulosa* (Ahl.)]

Muraena tessellata, Richardson. (= *Gymnothorax favagineus*, Bl. and Schn.)

Periophthalmus koelreuteri (Pall.).

Platycephalus insidiator (Forsk.). [= *P. indicus* (Forsk.)]

PlatyGLOSSUS leparensis (Bleeker).

Plesiops nigricans Rüpp.

Plotosus arab (Forsk.). (= *P. anguillaris*, Lacépede.)

Pomacentrus littoralis, Cuv. and Val.

Pristipoma furcatum (Bl. Schn.).

Salarias dussumieri, Cuv. and Val.

Salarias lineatus, Cuv. and Val.

Salarias quadricornis, Cuv. and Val. (= *S. rivulatus*, Rüpp.)

Scorpaena armata, Sauv.

Sebastichthys strongia, Cuv. and Val. (= *Sebastes strongia* C. V.)

Serranus boenack (Bloch.).

Serranus pantherinus (Lacépede).

Sillago sihama (Forsk.).

Stromateoides sinensis, (Euphr).

Therapon jarbua (Forsk.).

The freshwater streams also contained numerous examples of *Haplochilus panchax* (Ham. Buch.), and a species of *Gobius*: as regards the former, the examples obtained during my first visit in January agreed exactly with the description given by Day, but on my second visit I found that they had altered considerably as regards their colouration; this difference I

* Since the above list was compiled, Dr. Max Weber has published his account of the fish obtained by the "Siboga" (Siboga-Expeditie, Monograph LVII. "Die Fische der Siboga-Expedition." Leiden, 1913). As he has in many cases altered the nomenclature, I have given in brackets his specific name in all cases where any change has been made.